SAF-RC-008
ERDF Groundwater Well Samples
FINAL VALIDATION PACKAGE

COMPLETE COPY OF VALIDATION PACKAGE TO:

Kathy Wendt H4-21

COMMENTS:

SDG J01990 SAF-RC-008

ERDF GROUNDWATER WELL SAMPLES – Sept. 2013

Date: 4 November 20123
To: Washington Closure Hanford (technical representative)
From: ELR Consulting
Project: ERDF Groundwater Well Samples – September 2013
Subject: Radiochemistry - Data Package No. J01990-TAL

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. J01990 prepared by TestAmerica Inc. (TAL). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample Date	Media	Validation	Date
B2R159	9/30/13	Water	C	See note 1
B2R160	9/30/13	Water	C	See note 1

1 - Gross alpha and beta; carbon-14; technetium-99; iodine-129; total radium and total uranium.

Data validation was conducted in accordance with the WCH validation statement of work and WCH-198, Rev. 0, "Groundwater Protection Plan for the Environmental Restoration Disposal Facility". Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

· Holding Times

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

· Laboratory (Method) Blanks

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the required detection limit (RDL), the following qualifiers are applied: All positive sample results less than five times the highest blank

concentration are qualified as estimates and flagged "J"; sample results below the minimum detectable activity (MDA) are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All laboratory blank results were acceptable.

Field Blanks

One trip blank (B2R159) was submitted for analysis. Gross alpha was detected in the field blank. Under the WCH statement of work, no qualification is required.

· **Accuracy**

Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample (LCS) and matrix spike (MS) recovery range is 80-120%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

Due to the lack of a matrix spike analysis, all carbon-14 results were qualified as estimates and flagged "J".

Due to a tracer yield outside QC limits (106%), the I-129 result in sample B2R160 was qualified as an estimate and flagged "J".

All other accuracy results were acceptable.

· **Precision**

Analytical precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. If both sample and replicate activities are greater than five times the contract required detection limit (CRDL) and the RPD is less than 20 percent, the results are acceptable. If either activities are less then five times the CRDL, a control limit of less than or equal to two times the CRDL is used for soil samples and less than or equal to the CRDL for water samples. If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to the CRDL for water samples and less than or equal to two times the CRDL for soil samples. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable (although the trip blank was used for the duplicate analysis for I-129, gross alpha, total radium and TC-99).

Field Duplicate Samples

No field duplicates were submitted for analysis.

- **Detection Levels**

Reported analytical detection levels are compared against the project PQLs to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific PQL.

- **Completeness**

Data package SDG No. J01990 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiency was noted:

- Due to the lack of a matrix spike analysis, all carbon-14 results were qualified as estimates and flagged "J".

- Due to a tracer yield outside QC limits (106%), the I-129 result in sample B2R160 was qualified as an estimate and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services*.

WCH-198, Rev. 0, *Groundwater Protection Plan for the Environmental Restoration Disposal Facility,* February 2008.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the WCH statement of work are as follows:

U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.

UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.

J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.

R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.

UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

Appendix 2

Summary of Data Qualification

RADIOCHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: J01990	**REVIEWER: ELR**	**Project: ERDF**	**PAGE 1 OF 1**
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
C-14	J	All	No MS analysis
I-129	J	B2R160	Tracer recovery

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Annotated Laboratory Reports

Sample Results Summary

TestAmerica Inc TARL

Ordered by Method, Batch No., Client Sample ID.

11/3/13

Date: 29-Oct-13

Report No. : 57517

SDG No: J01990

Batch	Client Id / Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RPD
3276036 C14_CHEM_LSC									
B2R159									
	M15WX1AH	C-14	-7.43E+00 +- 9.1E+00	U J	pCi/L	100%	1.84E+01	2.00E+02	
B2R160									
	M15W11AH	C-14	-3.61E+00 +- 9.3E+00	U J	pCi/L	100%	1.85E+01	2.00E+02	
B2R160 DUP									
	M15W11AM	C-14	-3.11E+00 +- 9.2E+00	U	pCi/L	100%	1.83E+01	2.00E+02	-14.9
3276035 I129_SEP_LEPS_GS									
B2R159									
	M15WX1AF	I129	7.01E-02 +- 9.2E-02	U	pCi/L	98%	1.77E-01	1.00E+00	
B2R159 DUP									
	M15WX1AM	I129	6.23E-03 +- 9.9E-02	U	pCi/L	99%	1.75E-01	1.00E+00	167.3
B2R160									
	M15W11AF	I129	5.92E+00 +- 7.6E-01	J	pCi/L	106%	2.01E-01	1.00E+00	
3276033 9310_ALPHABETA_GPC									
B2R159									
	M15WX1AA	ALPHA	8.64E-01 +- 5.3E-01		pCi/L	100%	7.21E-01	3.00E+00	
B2R159 DUP									
	M15WX1AL	ALPHA	-7.80E-02 +- 4.0E-01	U	pCi/L	100%	7.87E-01	3.00E+00	239.7
B2R160									
	M15W11AA	ALPHA	1.60E+00 +- 1.5E+00	U	pCi/L	100%	2.44E+00	3.00E+00	
3276034 9310_ALPHABETA_GPC									
B2R159									
	M15WX1AC	BETA	1.39E-01 +- 1.1E+00	U	pCi/L	100%	2.08E+00	4.00E+00	
B2R160									
	M15W11AC	BETA	1.04E+01 +- 2.0E+00		pCi/L	100%	1.97E+00	4.00E+00	
B2R160 DUP									
	M15W11AL	BETA	9.70E+00 +- 1.9E+00		pCi/L	100%	2.07E+00	4.00E+00	7.3
3276037 RATOT_AEAGEA									
B2R159									
	M15WX1AG	TOTAL ALPHA RA	-1.08E-01 +- 1.7E-01	U	pCi/L	82%	5.88E-01	1.00E+00	
B2R159 DUP									
	M15WX1AN	TOTAL ALPHA RA	-1.20E-01 +- 1.9E-01	U	pCi/L	84%	6.27E-01	1.00E+00	-10.2
B2R160									
	M15W11AG	TOTAL ALPHA RA	7.64E-02 +- 2.2E-01	U	pCi/L	86%	5.08E-01	1.00E+00	
3276031 UTOT_KPA									
B2R159									
	M16WX1AE	TOTAL-URANIUM	2.02E-05 +- 2.6E-06	U	mg/L		8.19E-05	1.40E-01	
B2R159 DUP									
	M15WX2AJ	TOTAL-URANIUM	2.93E-05 +- 6.5E-06	U	mg/L		7.68E-05	1.40E-01	

TestAmerica Inc

rptSTLRchSaSummary2 V5.2.24 A2002

RPD - Relative Percent Difference.

U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

Sample Results Summary

Date: 29-Oct-13

TestAmerica Inc TARL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 57517 **SDG No:** J01990

Batch	Client Id / Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	MDL	CRDL	RPD
3276031	**UTOT_KPA**								
	B2R160								
	M15W11AE	TOTAL-URANIUM	2.04E-03 +- 2.1E-04		mg/L		8.22E-05	1.40E-01	
3276032	**TC99_SEP_LSC**								
	B2R159								
	M15WX1AD	TC-99	2.61E+00 +- 5.2E+00	U	pCi/L	100%	9.16E+00	1.50E+01	
	B2R159 DUP								
	M15WX1AK	TC-99	1.22E+00 +- 5.1E+00	U	pCi/L	100%	9.04E+00	1.50E+01	72.6
	B2R160								
	M15W11AD	TC-99	2.87E+01 +- 6.7E+00		pCi/L	100%	9.34E+00	1.50E+01	

No. of Results: 21

11/13/13

TestAmerica Inc
rptSTLRchSaSummary2 V5.2.24 A2002

RPD - Relative Percent Difference.

U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Certificate of Analysis

Washington Hanford Closure
2620 Fermi Avenue
Richland, WA 99354

October 29, 2013

Attention: Joan Kessner

SAF Number	:	RC-008S
Date SDG Closed	:	September 30, 2013
Number of Samples	:	Two (2)
Sample Type	:	Water
SDG Number	:	J01990
Data Deliverable	:	30– Day / Summary

CASE NARRATIVE

I. Introduction

On September 30, 2013, two water samples were received at TestAmerica for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID number to correspond with the Washington Closure Hanford (WCH) specific ID:

WCH ID#	TARL ID#	MATRIX	DATE OF RECEIPT
B2R159	M15WX	WATER	09/30/13
B2R160	M15W1	WATER	09/30/13

II. Sample Receipt

The samples were received in good condition and no anomalies were noted during check-in.

III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analyses were:

Gas Proportional Counting
Gross Alpha by method RL-GPC-001
Gross Beta by method RL-GPC-001
Total Alpha Radium by method RL-RA-002
Gamma Spectroscopy

Iodine-129LL by method RL-GAM-002
Liquid Scintillation Counting
Technetium-99 by method RL-LSC-013
Carbon-14 by method RL-LSC-008
Laser Induced Phosphorimetry
Total Uranium by method RL-KPA-003

IV. Quality Control

The analytical results for each analysis performed includes a minimum of one laboratory control sample (LCS), one method (reagent) blank, and one duplicate sample analysis. Any exceptions have been noted in the "Comments" section.

QC and sample results are reported in the same units.

V. Comments

Alpha Spectroscopy
Gas Proportional Counting
Gross Alpha by method RL-GPC-001:
The LCS, batch blank, samples and sample duplicate (B2R159) results are within contractual requirements.

Gross Beta by method RL-GPC-001:
The LCS, batch blank, samples and sample duplicate (B2R160) results are within contractual requirements.

Total Alpha Radium by method RL-RA-002:
The LCS, batch blank, samples and sample duplicate (B2R159) results are within contractual requirements.

Gamma Spectroscopy
Iodine-129LL by method RL-GAM-002:
The LCS, batch blank, samples and sample duplicate (B2R159) results are within contractual requirements.

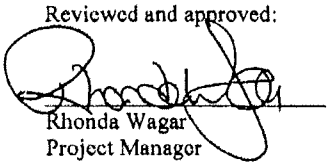
Liquid Scintillation Counting
Technetium-99 by method RL-LSC-013:
The LCS, batch blank, samples, sample duplicate (B2R159) and sample matrix spike (B2R160) results are within contractual requirements.

Carbon-14 by method RL-LSC-008:
The LCS, batch blank, samples and sample duplicate (B2R160) results are within contractual requirements.

Total Uranium
Total Uranium by method RL-KPA-003:
The sample duplicate (B2R159) result was not within the acceptance limits. The sample was recounted and standard addition was performed for an acceptable result. Except as noted; the LCS, batch blank, samples, sample duplicate (B2R159) and sample matrix spike (B2R160) results are within contractual requirements.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a designee as verified by the following signature.

Reviewed and approved:



Rhonda Wagar
Project Manager

TestAmerica Laboratories, Inc.

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	C.O.C. # RC-008S-011
		Page 1 of 1

Collector	DAVE FLOYD	**Contact/Requester**	Karen Waters-Husted	**Telephone No.**	509-376-4650
SAF No.	RC-008S	**Sampling Origin**	Hanford Site	**Purchase Order/Charge Code**	303126ES20
Project Title	ERDF, SEPTEMBER 2013	**Logbook No.**	HNF-N-506 57163	**Ice Chest No.**	N/A
Shipped To (Lab)	TestAmerica Incorporated, Richland	**Method of Shipment**	GOVERNMENT VEHICLE	**Bill of Lading/Air Bill No.**	N/A
Protocol	MM - S&GRP	**Priority:**	30 Days **PRIORITY**	**Offsite Property No.**	N/A

POSSIBLE SAMPLE HAZARDS/REMARKS
** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CRF but are not releasable per DOE Order 5400 5 (1990/1993)

SPECIAL INSTRUCTIONS **Hold Time** Total Activity Exemption: Yes ☑ No ☐

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2R159	N	W	SEP 3 0 2013	0830	1x1-L P	9310_ALPHABETA_GPC: COMMON	6 Months	HNO3 to pH <2
B2R159	N	W	↓	↓	1x20-mL P	Activity Scan	6 Months	None
B2R159	N	W			2x1-L G/P	C14_LSC: COMMON	6 Months	None
B2R159	N	W			2x4-L G/P	I129LL_SEP_LEPS_GS_LL: COMMON	6 Months	None
B2R159	N	W			1x500-mL G/P	KPA_UTOT: COMMON	6 Months	HNO3 to pH <2
B2R159	N	W			1x1-L G/P	RATOT_AEAGEA: COMMON	6 Months	HNO3 to pH <2
B2R159	N	W			3x1-L G/P	TC99_SEP_LSC: COMMON M15W4	6 Months	HCl to pH <2

J3J020437
J01990

J3J020437

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
DAVE FLOYD			SEP 3 0 2013 1420	J. Bock	Jack TALA		SEP 3 0 2013 1420
Relinquished By			Date/Time	Received By			Date/Time
Relinquished By			Date/Time	Received By			Date/Time
Relinquished By			Date/Time	Received By			Date/Time

Matrix *

S = Soil	DS = Drum Solids		
SE = Sediment	DL = Drum Liquids		
SO = Solid	T = Tissue		
SL = Sludge	WI = Wipe		
W = Water	L = Liquid		
O = Oil	V = Vegetation		
A = Air	X = Other		

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)	Disposed By	Date/Time

PRINTED O 9/5/2013 A-6004-842 (REV 2)

TestAmerica Laboratories, Inc.

17

37

CH2MHill Plateau Remediation Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	C.O.C. # RC-008S-012 Page 1 of 1

Collector	DAVE FLOYD	Contact/Requester	Karen Waters-Husted	Telephone No.	509-376-4650
SAF No.	RC-008S	Sampling Origin	Hanford Site	Purchase Order/Charge Code	303126ES20
Project Title	ERDF, SEPTEMBER 2013	Logbook No.	HNF-N-506 57163	Ice Chest No.	
Shipped To (Lab)	TestAmerica Incorporated, Richland	Method of Shipment	Commercial Carrier	Bill of Lading/Air Bill No.	
Protocol	MM - S&GRP	Priority:	30 Days PRIORITY	Offsite Property No.	

POSSIBLE SAMPLE HAZARDS/REMARKS
** ** Contains Radioactive Material at concentations that are not regulated for transportation per 49 CRF but are not releasable per DOE Order 5400 5 (1990/1993)

SPECIAL INSTRUCTIONS **Hold Time** Total Activity Exemption: Yes ☑ No ☐

Sample No.	Filter	*	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2R160	N	W	SEP 30 2013	1154	1x1-L P	9310_ALPHABETA_GPC: COMMON	6 Months	HNO3 to pH <2
B2R160	N	W	↓	↓	1x20-mL P	Activity Scan	6 Months	None
B2R160	N	W			2x1-L G/P	C14_LSC: COMMON	6 Months	None
B2R160	N	W			2x4-L G/P	I129LL_SEP_LEPS_GS_LL: COMMON	6 Months	None
B2R160	N	W			1x500-mL G/P	KPA_UTOT: COMMON	6 Months	HNO3 to pH <2
B2R160	N	W			1x1-L G/P	RATOT_AEAGEA: COMMON	6 Months	HNO3 to pH <2
B2R160	N	W			3x1-L G/P	TC99_SEP_LSC: COMMON M15W1	6 Months	HCl to pH <2

J35020437
J01990

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
DAVE FLOYD			SEP 30 2013 1420	J. Bock	Jbock	TALK	SEP 30 2013 1420
Relinquished By			Date/Time	Received By			Date/Time
Relinquished By			Date/Time	Received By			Date/Time
Relinquished By			Date/Time	Received By			Date/Time

Matrix *

S = Soil	DS = Drum Solids		
SE = Sediment	DL = Drum Liquids		
SO = Solid	T = Tissue		
SL = Sludge	WI = Wipe		
W = Water	L = Liquid		
O = Oil	V = Vegetation		
A = Air	X = Other		

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)	Disposed By	Date/Time

PRINTED O 9/5/2013

A-6004-842 (REV 2)

Appendix 5

Data Validation Supporting Documentation

APPENDIX A

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: ERDF			DATA PACKAGE: J01990		
VALIDATOR: FLR		LAB: TAL		DATE: 11/3/13	
			SDG: J01990		
ANALYSES PERFORMED					
☐ Gross Alpha/Beta	☐ Strontium-90	☐ Technetium-99	☐ Alpha Spectroscopy	☐ Gamma Spectroscopy	
X Total Uranium	☐ Radium-22	☐ Tritium	X C14	I-125	X tot Rad
SAMPLES/MATRIX					
B2R159	B2R160				
				Water	

1. Completeness ..... ☐ N/A

Technical verification forms present? ..... Yes No N/A

Comments: _____

_____

_____

_____

_____

2. Initial Calibration (Levels D, E) ..... ☐ N/A

Instruments/detectors calibrated? ..... Yes No N/A

Initial calibration acceptable? ..... Yes No N/A

Standards NIST traceable? ..... Yes No N/A

Standards Expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

_____

_____

_____

3. Continuing Calibration (Levels D, E) ☒ N/A

Calibration checked within required frequency? ..... Yes No N/A

Calibration check acceptable? ..... Yes No N/A

Calibration check standards traceable? ..... Yes No N/A

Calibration check standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

_____

_____

_____

_____

4. Background Counts (Levels D, E) ..... ☒ N/A

Background Counts checked within required frequency? ..... Yes No N/A

Background Counts acceptable? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments: _____

_____

_____

_____

_____

5. Blanks (Levels B, C, D, E) ..... ☐ N/A

Method blank analyzed within required frequency? ..... Yes No N/A
Method blank results acceptable? ..... Yes No N/A
Analytes detected in method blank? ..... Yes No N/A
Field blank(s) analyzed? ..... Yes No N/A
Field blank results acceptable? ..... Yes No N/A
Analytes detected in field blank(s)? ..... Yes No N/A
Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: _____

FB - grA in FB

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) ..... ☐ N/A

LCS /BSS analyzed within required frequency? ..... Yes No N/A
LCS/BSS recoveries acceptable? ..... Yes No N/A
LCS/BSS traceable? (Levels D,E) ..... Yes No N/A
LCS/BSS expired? (Levels D,E) ..... Yes No N/A
LCS/BSS levels correct? (Levels D,E) ..... Yes No N/A
Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: _____

7. Chemical Carrier Recovery (Levels C, D, E) ..... ☒ N/A

Chemical carrier added? ..... Yes No N/A
Chemical recovery acceptable? ..... Yes No N/A
Chemical carrier traceable? (Levels D, E) ..... Yes No N/A

Chemical carrier expired? (Levels D, E) ..... Yes No N/A

Transcription/Calculation errors? (Levels D, E) ..... Yes No N/A

Comments: _____

_____

_____

_____

_____

8. Tracer Recovery (Levels C, D, E) ..... ☐ N/A

Tracer added? ..... Yes No N/A

Tracer recovery acceptable? ..... Yes No N/A

Tracer traceable? (Levels D, E) ..... Yes No N/A

Tracer expired? (Levels D, E) ..... Yes No N/A

Transcription/Calculation errors? (Levels D, E) ..... Yes No N/A

Comments: 10690 1-129 - J (60)

_____

_____

_____

_____

9. Matrix Spikes (Levels C, D, E) ..... ☐ N/A

Matrix spike analyzed? ..... Yes No N/A

Spike recoveries acceptable? ..... Yes No N/A

Spike source traceable? (Levels D, E) ..... Yes No N/A

Spike source expired? Levels D, E) ..... Yes No N/A

Transcription/Calculation Errors? (Levels D, E) ..... Yes No N/A

Comments: no C14 MS - J acd

_____

_____

_____

_____

10. Duplicates (Levels C, D, E) ☐ N/A

Duplicates Analyzed at required frequency? Yes No N/A

RPD Values Acceptable? Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No N/A

Comments:

11. Field QC Samples (Levels C, D E) ☐ N/A

Field duplicate sample(s) analyzed? Yes No N/A

Field duplicate RPD values acceptable? Yes No N/A

Field split sample(s) analyzed? Yes No N/A

Field split RPD values acceptable? Yes No N/A

Performance audit sample(s) analyzed? Yes No N/A

Performance audit sample results acceptable? Yes No N/A

Comments: no field QC

12. Holding Times (All levels)

Are sample holding times acceptable? Yes No N/A

Comments:

13. Results and Detection Limits (All Levels) ☐ N/A

Results reported for all required sample analyses? Yes No N/A

Results supported in raw data?(Levels D, E) Yes No N/A

Results Acceptable? (Levels D, E) Yes No N/A

Transcription/Calculation errors? (Levels D, E) Yes No N/A

MDA's meet required detection limits? Yes No N/A

Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments:_____

_____

_____

_____

_____

Appendix 6

Additional Documentation Requested by Client

QC Results Summary

Date: 29-Oct-13

TestAmerica Inc TARL

Ordered by Method, Batch No, QC Type,.

Report No. : 57517 **SDG No.:** J01990

Batch / Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Tracer Yield	LCS Recovery	Bias	MDL
C14_CHEM_LSC								
3276036 BLANK QC,								
M155Q1AA	C-14	-1.46E+01 +- 8.8E+00	U	pCi/L	100%			1.82E+01
3276036 LCS,								
M155Q1AC	C-14	4.78E+02 +- 3.2E+01		pCi/L	100%	98%	0.0	1.83E+01
I129_SEP_LEPS_GS								
3276035 BLANK QC,								
M155N1AA	I129	-4.14E-02 +- 8.9E-02	U	pCi/L	99%			1.51E-01
3276035 LCS,								
M155N1AC	I129	9.43E+00 +- 1.1E+00		pCi/L	92%	97%	0.0	2.36E-01
9310_ALPHABETA_GPC								
3276033 BLANK QC,								
M155H1AA	ALPHA	-2.03E-01 +- 3.5E-01	U	pCi/L	100%			7.41E-01
3276033 LCS,								
M155H1AC	ALPHA	2.16E+01 +- 5.6E+00		pCi/L	100%	92%	-0.1	7.89E-01
9310_ALPHABETA_GPC								
3276034 BLANK QC,								
M155L1AA	BETA	2.33E-01 +- 9.0E-01	U	pCi/L	100%			1.76E+00
3276034 LCS,								
M155L1AC	BETA	2.04E+01 +- 3.1E+00		pCi/L	100%	90%	-0.1	1.77E+00
RATOT_AEAGEA								
3276037 BLANK QC,								
M155V1AA	TOTAL ALPHA RA	-2.09E-02 +- 2.0E-01	U	pCi/L	85%			5.69E-01
3276037 LCS,								
M155V1AC	TOTAL ALPHA RA	6.12E+00 +- 1.7E+00		pCi/L	81%	97%	0.0	5.69E-01
UTOT_KPA								
3276031 MATRIX SPIKE, B2R160								
M15W11AJ	TOTAL-URANIUM	2.94E-02 +- 3.7E-03		mg/L		93%	-0.1	7.25E-05
3276031 BLANK QC,								
M155A1AA	TOTAL-URANIUM	4.97E-06 +- 6.1E-07	U	mg/L				8.22E-05
3276031 LCS,								
M155A1AD	TOTAL-URANIUM	3.30E-03 +- 3.4E-04		mg/L		91%	-0.1	8.28E-05
M155A1AC	TOTAL-URANIUM	3.24E-02 +- 3.8E-03		mg/L		94%	-0.1	7.88E-05
TC99_SEP_LSC								
3276032 MATRIX SPIKE, B2R160								
M15W11AK	TC-99	3.04E+03 +- 1.7E+02		pCi/L	100%	87%	-0.1	9.14E+00
3276032 BLANK QC,								
M155E1AA	TC-99	3.53E+00 +- 5.4E+00	U	pCi/L	100%			9.37E+00
3276032 LCS,								
M155E1AC	TC-99	4.42E+02 +- 2.9E+01		pCi/L	100%	85%	-0.2	9.04E+00

No. of Results: 17

TestAmerica Inc *Bias - (Result/Expected)-1 as defined by ANSI N13.30.*

rptSTLRchQcSummary V5.2.24 A2002

U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.